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ABSTRACT

The paper examines the use of concrete symbol systems to make the transition from presymbolic to formal symbolic communication for deaf blind students. Comments focus on expressive use of concrete symbols and address two issues requiring further research: (1) the critical features of referent objects, concrete symbols, and concrete symbol arrays that must be considered in designing an initial symbol system; and (2) methods for moving systematically towards more conventional and abstract symbol systems. Referents, concrete symbols and symbol arrays are discussed in terms of frequency, number of distractors, specificity, and iconicity. The report offers potential training sequences to enhance the systematic progression from concrete to formal symbolic systems. (CL)

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CONCRETE SYMBOL SYSTEMS: SYMBOLIC SKILLS FOR CHILDREN WITH MULTIPLE DISABILITIES

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CONCRETE SYMBOL SYSTEMS: SYMBOLIC SKILLS FOR CHILDREN WITH MULTIPLE DISABILITIES

Werner and Kaplan (1963) view language development as a process of symbol formation culminating in the use of speech symbols that are ultimately traceable to the original dynamic and material properties of the objects that they represent. Two major processes are involved in symbol formation, according to Werner & Kaplan. These are: Denaturalization and Decontextualization.

Denaturalization refers to decreasing material similarity between the symbol and its referent. The nondisabled child may at first reference objects through a combination of "natural" gestures that mimic the action properties of the referent and vocal imitations of the referent's auditory properties. These symbolic gestures and vocalizations bear a strong material similarity to the perceptual properties of their referents. Later, spoken words with no clear perceptual relationship to their referents will be used as symbols.

Decontextualization refers to both spatial and temporal distancing between symbols and their referents. Language allows us to communicate about objects or events that are physically distant (e.g. objects that are out of sight) and about topics that are temporally distant (e.g. occurring yesterday or tomorrow). While the conventional gestures--such as pointing, waving, extending objects--allow communication about the immediate here and now, they do not allow communication about specific objects that are absent or about temporally distant events. A symbol with a predetermined 1:1 correspondence to a referent is required in order to refer to a specific object, person or event that is spatially or temporally absent.

My current research with young deaf-blind children has shown that the gap between presymbolic gestural communication and the use of formal symbol systems (speech, or manual sign language) is not easily bridged. For some of these students, I am examining tge use of concrete symbol systems to systematically scaffold the transition from presymbolic to formal symbolic communication.

Concrete symbol systems utilize objects as permanent representations of environmental entities. In contrast to the commercially available nonspeech symbol systems such as

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Blissymbolics (McNaughton and Kates, 1980), Rebus (Woodcock, Clark & Davies, 1969), and NonSLIP (Carrier & Peak, 1975), the use of concrete symbols makes relatively low demands on cognitive abilities and visual acuity. Because they are permanent symbols, only recognition memory, rather than recall memory is necessary for communication, and only a very simple indicating response (such as pointing, touching or grasping) is necessary for expressive use. Because they are 3-dimensional, concrete symbols are tactiley discriminable. Finally, concrete symbols may bear a very strong perceptual relationship to their referents.

Let me describe the typical student who appears to be a suitable candidate for concrete symbol training. The student has acquired , either spontaneously or through training, a moderate repertoire of conventional and nonconventional gestures, such as pointing, extending objects, tapping people for atention, pushing away, etc. The student has failed to acquire speech or manual signs after several years of training and does not have the representational skills needed for picture communication. The student may use a small repertoire of signs indiscriminately, running through his or her repertoire whenever it is clear that a sign is an appropriate response. The student seems to have no concept of a 1:1 correspondence between a particular sign and its referent.

The use of objects as symbols seems to have been an outgrowth Van Dijk's work (1966/67) with deaf-blind children. Van Dijk, in turn, bases his approach on the theories of Werner & Kaplan. Writer(1984) and Stillman & Battle (1985) have described the use of concrete objects as symbols within the context of "concrete calendar systems" that utilize objects initially as receptive cues within a time-management system.

Today, I am going to talk strictly about the Expressive rather than Receptive use of concrete symbols and I will address two issues that deserve further research. These are:

1. The critical parameters of referent objects, concrete symbols, and concrete symbol arrays that must be considered in designing an initial concrete symbol system.

2. Methods for moving systematically towards more conventional and abstract symbol systems.

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Parameters of Referent Entities, Concrete Symbols and Arrays

First, we need to consider the referents, the concrete symbols themselves and the nature of the symbol array. I will discuss four critical variables that are important in the choice of an initial concrete symbol lexicon. These are represented in Figure 1.

---- OVERHEAD ----

As we move outward from the center of this square we progress to more advanced levels on any one of the four parameters. Let's take the easy ones first:

Frequency. The frequency with which a symbol may be used is also an index of the functionality of its referent in the student's world. How many opportuniites for its use occur normally during the average day? When we first introduce symbols, we naturally want to start with extremely functional referents, for which multiple opportunities for use will occur, so that the student achieves adequate practice to make the association between the symbol and the referent. As symbol use becomes second nature, we may be able to introduce symbols for which only one or fewer opportunites occur daily (for instance, a symbol for going swimming, which occurs only once a week).

Distractors. With some students who need training in the giving and taking of objects, we may need to start with only one symbol and no distractors, requiring them to extend the concrete symbol prior to receiving its referent. Until the student is discriminating between at least two symbols , however, we have no evidence that one symbol is associated exclusively with one referent, as opposed to another. Once the student has achieved correct use of two symbols within one array, we want to increase the number of symbols per array rather quickly , in order to increase vocabulary.

Specificity. 1:1 correspondence between a symbol and referent is most easily instilled if the symbol has but one referent in the environment. If we start with symbols that are relatively nonspecific, such as EAT or HELP, it may not be clear that the symbol (unlike a gesture) has a lmiited domain of referents. If we train a symbol for EAT, which is used to request any food, then when we want to train a symbol just for RAISIN, say, we have to untrain the use of

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Date _____

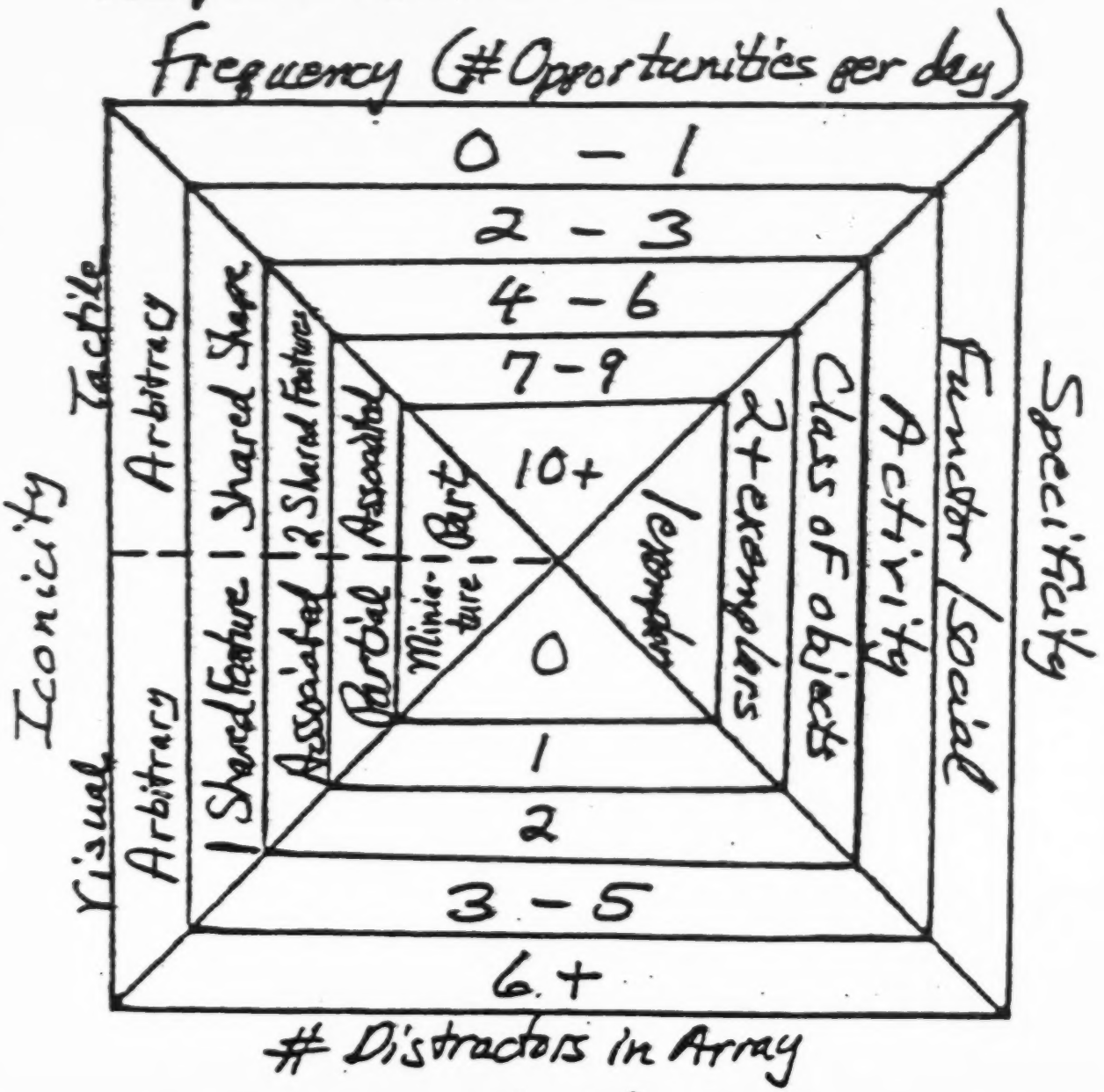
Symbol _____

_____

Contexts _____

Expressive Goal _____

Receptive Goal _____



the EAT symbol for raisins. It would be better to start with the RAISIN symbol, add a few more symbols for specific foods, then train a symbol for EAT, which allows the student access to the entire array of symbols for specific foods. On your figure you can see that the level of greatest specificity allows for only one exemplar of the referent. We move up through increasingly nonspecific referents up to functors and social constructs such as YES, NO, MORE, FINISHED, which have no specific environmental referents at all.

Iconicity. Iconicity refers to the degree to which the symbol is perceptually related to the referent--or the degree to which the physical properties of the referent are mirrored by the symbol. We proceed on this parameter from symbols that are virtually identical to the referent to symbols that bear a completely arbitrary relationship to the physical properties of the referent. This is the Denaturalization process.

Perceptual iconicity is sense-dependent. A symbol that bears a strong visual similarity to the referent may not be tactiley similar at all. For instance, the tactile/kinesthetic sensations afforded when a child is draped over a large therapy ball are pretty far removed from the sensations afforded by grasping a small rubber ball. The small rubber ball has strong visual similarity to the therapy ball and might constitute a highly iconic symbol for the therapy ball to a child with sight, but it would be a more abstract symbol to a child without sight.

Accordingly, two separate progressions are provided for the iconicity parameter, one for the sighted student (the Visual track) and one for the nonsighted student (the Tactile track). These are illustrated in more detail in Figure 2.

---OVERHEAD---

For the sighted student (see the Visual track), we may start with a miniature version of an object or a large version of a very small object that shares texture, shape, color and overall design with the referent. Then we may move to a part-whole relationship, sharing these same features, but in abbreviated fashion . Then we move to use of an associated object, where function and context, rather than perceptual features are shared. (In actual practice, you will find that certain refrents lend themselves to

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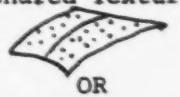
Levels of Iconicity & Examples of Symbols

Visual			Referent	Tactile		
	Iconic Relationship	Symbol		Symbol	Iconic Relationship	
I	MINIATURE OBJECT	TOY PHONE	PHONE	DIAL FROM PHONE	PARTIAL OBJECT	I
II	PARTIAL OBJECT	SEAT BELT BUCKLE	CAR/ OUT	CAR KEY	ASSOCIATED OBJECT	II
III	ASSOCIATED OBJECT	COAT HOOK	COAT	COAT FABRIC ON COAT-SHAPED BLOCK	TWO SHARED FEATURES (SHAPE + TEXTURE)	III
IV	ONE SHARED FEATURE	BASKETBALL FABRIC (Shared Texture)  OR PING PONG BALL (Shared Shape)	BASKET-BALL	PING PONG BALL	SHARED SHAPE	IV
V	ARBITRARY	ABSTRACT 3-D SHAPE	FINISHED	ABSTRACT 3-D SHAPE OR BRAILLE SYMBOL	ARBITRARY	V

representation via a partial object while others lend themselves more readily to representation via a functionally associated object: some objects cannot be divided into parts, while others are not routinely associated with any particular object.) As the perceptual relationship becomes more arbitrary, we progressively limit the number of shared perceptual features to one: either shape or texture. Finally, we reach the stage where the symbol bears a purely arbitrary relaticnship to its referent. The symbol is an abstract shape that through training comes to be associated with the referent. At this point, we have actually reached communication via abstract symbols.

For the student without sight, the tactile progression varies slightly. We start with a part of the referent, immediately tactiley recognizable, proceed to an associated object, then to a form that shares shape and texture. The next level is a symbol that shares the shape of the referent--a miniature version of a large object or a large version of a very small object. Finally, we have an arbitrary symbol such as an abstract 3-dimensional shape or possibly a Braille configuration.

These progressions are not intended to suggest a sequence through which all students would progress, but are offered in order to increase awareness of the different degrees of pereceptual relationship between referents and symbols and to encourage the progressive denaturalization of symbols as concrete symbol systems are modified and expanded.

Training Sequences

Now I would like to illustrate some potential training sequences to scaffold the systematic progression from concrete symbolic systems to formal symbolic systems. Figure 3 presents a flow chart illustrating these sequences.

---- OVERHEAD ----

Down the left side of this figure are the levels of communicative competence that are represented by the various communication systems that appear on the right of the figure. We must start with a student who has presymbolic, intentional communication. (If we don't have the basic mechanisms of intentional communication, we are not ready for the expressive use of symbols). To reach a stage of concrete symbol use, we have two options,: Concrete Objects

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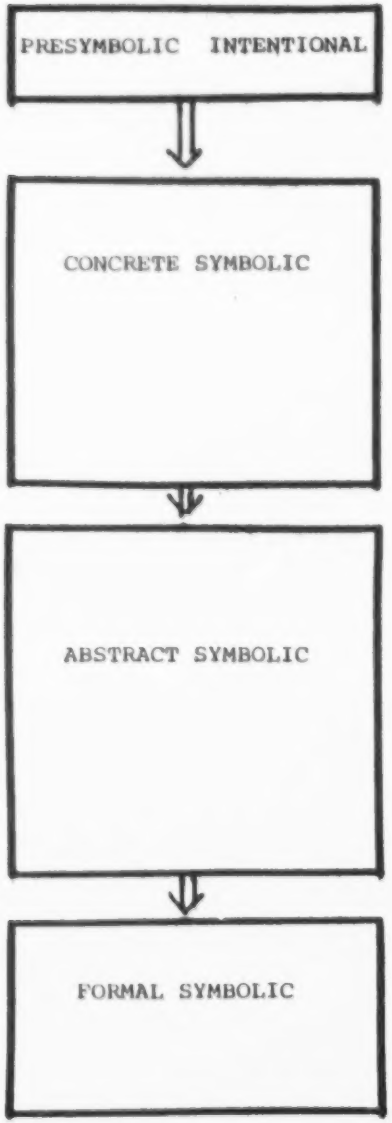
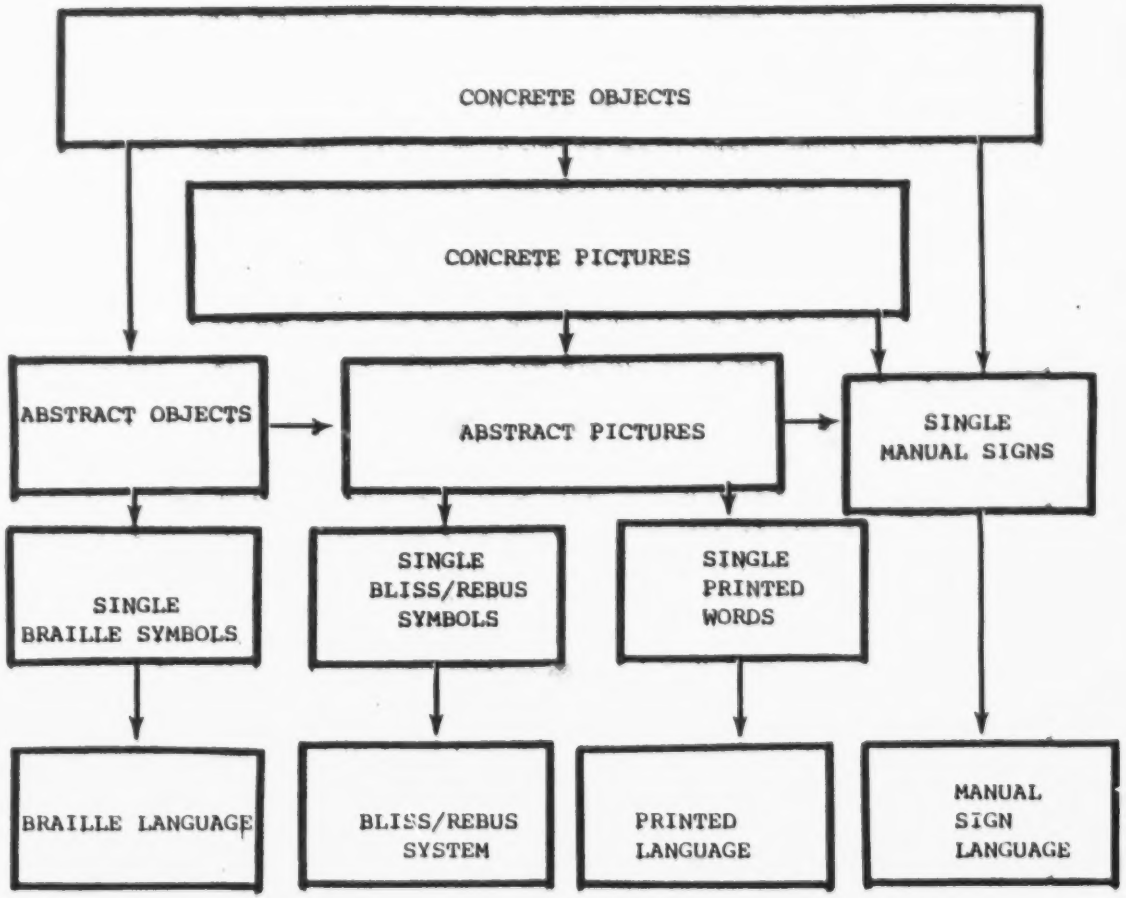
LEVEL OF COMMUNICATION



SUGGESTED SYMBOL TRAINING SEQUENCES



, which I have just discussed, and Concrete Pictures (photos or line drawings of referents). A student with picture-object matching skills may enter directly at the concrete picture stage. To move to the use of single, abstract symbols that bear an arbitrary relationship to their referents (abstract symbolic communication), we have three options: Abstract Objects ; Abstract Pictures ; and Manual Signs. Abstract object symbols may possibly then be faded into Braille symbols, while absrtact pictures may be faded into Bliss or Rebus symbols or sometimes even into single printed words. Alternatively, we may elect to move from object or picture symbols to manual signs. Once single abstract symbols have been acquired, whether they are pictures, objects or manual signs, some students may eventually reach the stage of formal symbolic communication, where symbols are combined in a rule-bound fashion into multi-symbol utterances.

The point of this figure is first to encourage foresight in the planning of communication interventions and second to encourage a persistent effort to push the student to a more sophisticated level of communication and to the use of more conventional communication systems. Although some students may never progress beyond the use of concrete symbol systems, others may use concrete symbols only as a transitional phase. Once they have mastered the rules of symbolic referencing, they may be able to move on to the use of more abstract or conventional symbol systems.

---OVERHEAD---

CONCLUSIONS/SUMMARY

To summarize my major points, I would like to make three statements:

1. Concrete symbols may afford a student the opportunity to communicate about specific environmental entitities when other methods are not effective.

2. The initial lexicon must be chosen very carefully,taking into consideration at least the four major variables of frequency of use, number of distractors in the symbol array, iconicity of the symbol, and specificity of the referent.

3. Once communication via concrete symbols is achieved, we must continue to push for the use of increasingly abstract and conventional communication systems in a systematic fashion.

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CONCRETE SYMBOL SYSTEMS: SYMBOLIC SKILLS FOR CHILDREN WITH MULTIPLE DISABILITIES

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The combination of a limited gestural capacity and social motivation does not necessarily predispose a child with multiple disabilities to acquire a formal language system. Research is currently underway to examine the efficacy of scaffolding the transition from presymbolic to abstract symbolic behavior through the training of concrete symbol systems, which utilize concrete objects to represent environmental entities. The concrete symbol sequence will be overviewed and acquisition data from deaf-blind students will be presented.

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